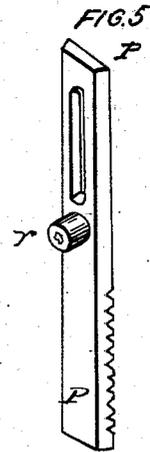
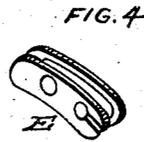
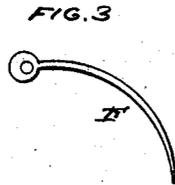
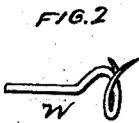
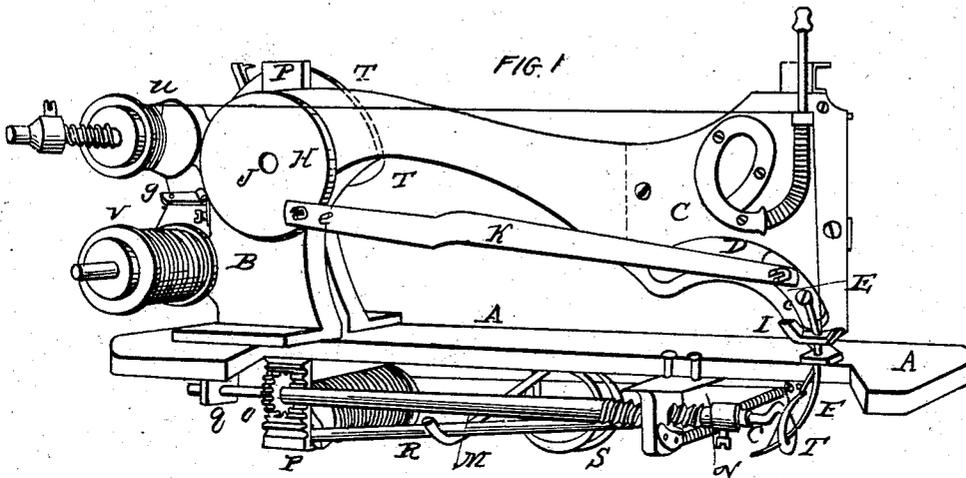


E. E. CLARK.
Sewing Machine.

No. 74,751.

Patented Feb. 25, 1868.



WITNESSES
Edward Clark
M. Peery

INVENTOR
Edward E. Clark

United States Patent Office.

EDWIN E. CLARK, OF ANN ARBOR, MICHIGAN

Letters Patent No. 74,751, dated February 25, 1868.

IMPROVEMENT IN SEWING-MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, EDWIN E. CLARK, of Ann Arbor, in the county of Washtenaw, in the State of Michigan, have invented certain new and improved Devices to be Used as Stitch-Making Parts of Machines Constructed for Sewing and Embroidering Cloth or other material; and I do hereby declare that the following is a full and an exact description of the construction and operation of the same, reference being had to the accompanying drawings and the letters of reference marked thereon.

The nature and subject-matter of my invention may properly be divided into two parts, consisting of—

First, a novel method of forming the loops of the thread carried by an eye-pointed perforating-needle, and for that purpose I employ a needle, novel in its form and construction. The needles now and hitherto used are either straight or slightly curved, and the loops of the thread carried by the same are formed alike in both cases, by the slackening of the thread while the needle is being withdrawn from the cloth. The needle which I have substituted is much more bowed or curved than the curved needles hitherto used, and the loops are formed by the curvature and construction of the needle, in a manner accompanied with a much greater certainty than the method hitherto adopted. Also, certain parts of novel construction and arrangement in the machine, by which such needle is held, controlled, supported, and vibrated in such a manner as to operate successfully, in distinction from the devices heretofore adopted for operating the curved needles hitherto used, which are not applicable to the needle which I have substituted therefor.

Second, a novel instrument for detaining and spreading the loop of the thread carried by the perforating-needle, which is also called a looper, and is used in that class of sewing-machines which make the chain or tambour stitch. It has a spiral form, is forked at the point, and receives a spiral vibratory movement. The loop is seized by the forked point, and, being spread and enlarged by the form and movement of the instrument, is carried into a position to be entered by the perforating-needle. This part of my invention also embraces a looper-shaft, together with certain devices connected therewith, by which the spiral vibratory movement before mentioned is given to such looper-shaft and looper.

The construction, operation, and uses of the several devices herein mentioned are fully set forth and explained in the description hereinafter given.

To enable others skilled in the art to make and use the several devices before mentioned as of my invention, I will proceed to describe the same. The accompanying drawings, which will constitute a part of my description, consist of five several and distinct parts, represented by figures.

Figure 1 is a perspective view, exhibiting most of the parts which constitute my invention, so placed and arranged as to show their respective and relative positions in a machine, and when being operated.

Figures 2, 3, 4, and 5 represent each respectively some part of my invention, which is not shown or not fully exhibited in fig. 1.

In referring to the drawings by the letters of reference marked thereon, the reference will in all cases be made and apply to fig. 1 of the same, except when the other figures shall be each respectively referred to by an especial mention and designation of the same.

Commencing with part first of my invention, A A represent the cloth-table of a sewing-machine, having a part of the same cut away for the purpose of bringing to view certain parts of my invention which are located beneath the same. B is a standard, fastened to such cloth-table on the upper side, and near to one end of the same, having an arm, which projects over such cloth-table in the usual manner. On the end of such arm there is fastened slotted plate C, in a position perpendicular to the cloth-table, having in its lower part slot D D. Such slot is in the form of an arc of a small circle, and has parallel sides. E represents a vibrating-needle holder, confined within slot D, D, and is constructed of two small oblong and flat pieces or plates of metal, one of which is so cut away and shaped on one side as to form an oblong-curved projection, which is inserted between the sides of such slot, and passing through the same is flush and even with the surface of plate C on the other side. Against such projection, on such other side, the other or second plate is placed, and projects past the sides of the slot. The two pieces are fastened together by screws, *a* and *b*. Screw *a* also fastens the needle to the needle-holder, and the screw *b* forms a holding-pin, to connect the connecting-bar K with the same, as hereinafter described. The needle-holder, thus formed, becomes practically one piece, having grooves on two

opposite sides, which are filled by the edges of the plate C, and is thus securely confined therein. Such needle-holder is fully shown at E, fig. 4. The needle-holder occupies only a part of the slot, a sufficient space being left for its necessary motion within the same. H represents a revolving crank-wheel, attached to the end of the driving-shaft of the machine at J. K represents a connecting-bar, one end of which is attached to the crank-wheel H by crank-pin *e*, and the other end to needle-holder E, by holding-pin *b*, before mentioned, for the purpose of giving a reciprocatory motion to such needle-holder. F represents a reciprocating needle, bent or bowed in the form of the arc of a small circle, conforming in curvature to a central line drawn through the middle of slot D D, parallel to the sides of the same. It is grooved on the outer or convex side, and has an eye near the point, passing through it from the outer to the inner side in the plane of its curvature. The shank is bent in the form of a ring or loop, and is countersunk, with a small part of the needle-stock, in the side of the needle-holder at the fore end of the same, and is fastened thereto by screw *a*, which passes through the loop or ring, and has its head tightly screwed down upon the same. In placing and fastening the needle upon the needle-holder, such a direction is given to the projecting and perforating part of the same, that when out of the cloth, and lying at its farthest point backward, such projecting part extends forward in a line parallel with the central line through slot D D, before mentioned, which has the same curvature as itself. By the construction and arrangement of the parts as thus described, when reciprocating movement is given to the needle-holder, it follows the curve of slot D D, and the needle reciprocates in the arc of a circle, having the same curvature with itself. Such needle is separately and fully shown at F, fig. 3. I is a small projection from plate C at the lower end of slot D D, with a hole or eye through it, situated directly in the path of needle F, and in which the same is confined, for the purpose of staying and supporting such needle during its movements. When the needle is out of the cloth, and drawn back to its farthest point, the extreme point of the same rests within such hole or eye in projection I, the eye of such needle being sufficiently above the same to admit of its being threaded, and when the needle moves forward, and penetrates the material being sewed, it is prevented by such projection from springing or spreading in any direction.

The curvature of needle F is represented by the arc of a much smaller circle than the curvature of the curved perforating-needles heretofore used, and the loops of the thread carried by such needle are formed in a manner new and different from that which has been heretofore used, all of which I will now describe and explain.

When needle F moves forward, and passes through the cloth or material being sewed, it carries along the thread doubled, the portion of the thread on the outer side of the needle lying in the groove of the needle, and the portion of the same on the inside of the needle lying in a straight line from the eye of the needle to the cloth, in the manner in which the chord subtends an arc of a circle. The two portions of the thread are thus separated, and a loop is formed, which continues to be enlarged and spread, until the needle has arrived at its farthest point downward. By constructing such needle with a suitable curvature, and of a proper length, the loop thus formed is sufficiently large and practicable to admit the point of a shuttle, looper, hook, or any other instrument which may be used for connecting it with another thread, or another loop of the same thread in the formation of stitches. Such loop is represented at *cc* in the drawings. After the entering of the point of such instrument, if such instrument be properly constructed for that purpose, the loop will be sufficiently enlarged by its own form and lateral pressure for the further passing in or through it of the same, as may be necessary, or such loop may be distended for that purpose by an auxiliary instrument.

I am not aware that loops have been heretofore formed in the manner thus described, in any sewing-machine using a single eye-pointed perforating-needle in conjunction with an auxiliary instrument for the formation of stitches, or that any needle of suitable curvature and construction for that purpose has been used in any such machine. The eye-pointed perforating-needles hitherto and now used, are either straight or slightly curved, the curvature of such curved needles being represented by the arcs of circles comparatively large, and the loops of the thread carried by the same are formed alike in both cases, by the slackening of the thread while the needle is being withdrawn from the cloth. Such loops are loose, slack, and uncertain in both their formation and their practicability for use. Sometimes the thread slides upward with the needle while being withdrawn from the cloth, and no loop is formed; at other times, the loop is formed on the side of the needle adverse to the instrument, which is intended to assist it, or, while being formed, flies away from the track of such instrument. In such cases the stitch is missed or not formed.

In using needles having the slight curvature of the curved needles hitherto used, with otherwise the same construction, and operated in the same manner as needle F, the portions of the thread on the inner and outer side of the needle are not sufficiently separated to admit of practicable loops being formed by the curvature of the same. In distinction therefrom, by using needles more and sufficiently bowed or curved, as represented by needle F, such practicable loops are formed with a high degree of mechanical certainty.

I do not limit and confine myself to needles having a specific and defined curvature, as needles having many different degrees of curvatures may be used to form such loops. But my invention relates to and embraces the method of forming loops by the curvature of the needle, in the manner hereinbefore described, and the use of a needle of a suitable curvature and construction for that purpose, both of which I consider as new and hitherto unused.

A different and equivalent construction may be given to the several parts hereinbefore described. Therefore I do not confine myself to the precise construction of needle-holder E, and to the confining the same within slot D D, as the same may be constructed and confined to or between one or more ribs of metal in many different ways and modes. Nor do I confine myself to forming the needle with a bent shank, and fastening the same to the needle-holder in the manner described, as a different mode of forming the shank and fastening the same may be adopted. Needle-support I may also be given a different and equivalent construction. Nor do I limit myself to the mode of operating the needle-holder and needle, by revolving crank-wheel H, and connecting-bar

K, as equivalent modes may be adopted. But I consider my invention as embracing the principle of the operation of the several parts, whatever may be the precise mode or form of their construction.

Needles corresponding with the before-described needle F, have not, within my knowledge, been hitherto used in sewing-machines. Neither am I aware that any device has been adopted by which such needle can be successfully operated.

In using needles curved in the form of an arc of a circle, it is necessary that they should be reciprocated in an arc of a circle of the same curvature with themselves, to prevent their tearing or moving the cloth or material being sewed. It is also important that the centre of the circle in the arc of which the needle moves, when two or more pieces of cloth or other material are being sewed together, be in or near the plane in which the cloth moves, to prevent the stitches from being laid obliquely through the same, and occasioning thereby a slipping or sliding of the pieces upon each other, and a loosening of the stitches.

In sewing-machines using needles slightly curved, as before mentioned, the needles have been attached to the end of a vibrating-lever or arm, the fulcrum or vibrating centre of the same being at the end of the cloth-table opposite to the needle, such lever or arm being the radius of a circle, corresponding with such needle in curvature, and of sufficient length to admit of a sufficient cloth-space between the fulcrum and needle. But in using needles of a suitable curvature for forming loops by the curvature of the same, in the manner before described, this method is impracticable. The curvature of such a needle must correspond with an arc of a circle of only a few inches in diameter, and the vibrating-lever or arm representing the radius of such circle, will be so short that if the fulcrum or vibrating centre be placed in the plane of the cloth, too small a space will be left between it and the needle for a practicable cloth-table. I have therefore adopted a novel method of operating such needle, which is fully shown in the drawings hereinbefore described, and may be explained in the following manner by reference thereto: A circle is supposed to be drawn, the plane of which lies at right angles to the surface of the cloth-table, and a part of the circumference of which coincides with needle F and the arc of the circle in which it moves. Such circle is bisected into two equal parts or semicircles, by the surface of the cloth-table A A, which is practically the same as the plane of the cloth, or the plane in which the cloth moves. The needle-holder E, and the slot D D in plate C, in which the needle-holder is confined, are situated at the upper part of one of such semicircles lying above the cloth-table; and when the needle-holder lies at the back end of the slot, and the needle is consequently withdrawn from the cloth, there is an open and unobstructed space between the slotted plate C and the cloth-table, sufficiently large to admit of the inserting, confining, and moving the cloth or material being sewed. The needle is moved in the manner before described, by connecting the needle-holder with revolving crank-wheel H, by connecting-bar K, lying above the cloth-table. The connecting-bar K can be made of any desired length, and the standard B and the driving part of the machine can be placed at any corresponding required distance from the needle, without any change being made in the position of the same. By the construction and arrangement of the parts thus shown and described, the centre of vibration of the needle is placed in the plane in which the cloth moves at the fore part of the cloth-table, and any required cloth-space is obtainable between the needle and the driving part of the machine, in the manner described.

Having now sufficiently set forth part first of my invention, I will proceed to describe the second part of the same, reference being had to the drawings.

M is a looper-shaft, constructed of a round rod, passing along under and parallel with the cloth-table, into the end of which the shank of looper W, hereinafter described, is inserted and fastened by set-screw *f*. At N there is a screw upon such looper-shaft, passing through a corresponding stationary nut or female screw fastened to the under side of the cloth-table, for the purpose of giving an advancing and receding spiral movement to such shaft and looper, as hereinafter described. The looper-shaft is held in its position by the nut at N, and the standing plate or standard Q, at the back end of the machine, the end of the shaft passing through the same. T is a revolving cam, placed and fastened on the driving-shaft J, on the opposite or further side of standard B. P P is a rack-bar, stationed in a vertical groove, also in the opposite or further side of standard B, and not in view. There is on such rack-bar a projecting pin, holding a friction-roller under and in contact with the edge of cam T. R is a vibrating-lever or bar, one end of which is fastened to the nut at N, by a stationary pin, which constitutes its fulcrum; the other end rests upon a projection on the lower end of rack-bar P P, and is forced against the same by coiled spring S, carrying upwards such rack-bar, and keeping the friction-roller on the same in constant contact with the edge of cam T. O is a small cog-wheel, placed and fastened on looper-shaft M, having the cogs on the same fitting or gearing in with the teeth of rack-bar P P. Rack-bar P P, with the friction-roller V on the same, is separately and fully shown by fig. 5 of the drawings.

When the machine is in motion, revolving cam T, in conjunction with spring-bar R, causes an up-and-down motion of rack-bar P P, which produces, by the operation of cog-wheel O, and the screw on the looper-shaft, and the nut at N, a longitudinal reciprocating as well as rocking movement of the looper-shaft and looper. Cam T is so formed as to hasten or retard the movement of the looper, as may be necessary, while operating in conjunction with the perforating-needle in forming stitches.

The loop-detaining instrument hereinbefore mentioned as a part of my invention, which is designed to be used in forming the chain or tambour-stitch with a single thread, is represented at W, fig. 2. It is constructed of a rod or elongated piece of metal, one end of which constitutes a straight shank; the other end is bent into the form of a spiral coil of a single winding, more or less; and the point is divided into two prongs, an upper and a lower one. The point of the lower prong is bent inwardly toward the shank of the looper, while the upper prong extends forward in a direct line. The instrument or looper W, when used, is fastened within the looper-shaft M, and operated by the same.

Its mode of operation in conjunction with the perforating-needle, is as follows: When the loop of the thread carried by the perforating-needle is fully formed, as represented at *c c*, the looper moves forward, and the pro-

jecting prong enters the loop. Its further progress within the same is soon arrested by the bent lower prong, and as the perforating-needle retires upward to pass out of the cloth, the loop becomes hung between the two prongs. Then as the point of the looper progresses downward in its spiral course, the body of the looper slides or passes in between the two sides of the loop, and the same is thereby continually spread and enlarged by the form of the instrument, until the forward movement of the looper is completed. The perforating-needle then returns, and when it has made a sufficient progress downward, the looper assumes its backward movement and throws the loop over the point of the perforating-needle, and the same is drawn up to the cloth in the usual manner.

I do not confine myself exclusively to the use of the screw on the looper-shaft and the stationary nut at N, for the purpose of producing the particular spiral movement of the looper-shaft and loopers before described, as the same may be produced by a pin in such shaft, fitting and operating in a spiral slot in a stationary collar or sleeve, through which such looper-shaft may be made to pass. Nor do I limit myself to the particular mode of giving a rocking movement to such looper-shaft, by means of the cog-wheel on the same at O, rack-bar P P, and revolving cam T, as the same may be effected in other and different modes, by known devices. Also, I do not confine loopers L and W to a conjunction with needle F, in operating in the manner described, as they severally operate in precisely the same manner in conjunction with the eye-pointed perforating-needles heretofore used, forming respectively the double-loop and the chain or tambour-stitches.

Having now sufficiently set forth and described the construction and operation of the several devices which constitute my invention, I will proceed to state what I claim, and desire to secure by Letters Patent.

I claim—

1. The slotted plate C, constructed substantially as described and for the purpose set forth.
2. The needle-holder E, constructed substantially as described, in combination with the slotted guiding plate C, as and for the purpose set forth.
3. The curved eye-pointed needle F, operating in the arc of a circle, the centre of movement of which corresponds with the plane of the movement of the cloth, and operated by means substantially as described.
4. The looper W, constructed and operated substantially as described.
5. The combination of looper W and curved eye-pointed needle F, when constructed and operating together as and for the purpose set forth.

EDWIN E. CLARK.

Witnesses:

O. HAWKINS,
J. R. WEBSTER.